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ABSTRACT

A machine structural steel product having superior formability of rotary-forming, torsional properties, and quenching-crack resistance is provided which is manufactured using an electric furnace instead of a blast furnace and which removes adverse influences of tramp elements. A drive shaft having a superior static strength and fatigue strength is provided. In particular, the machine structural steel product contains: on a mass percent basis, C: 0.35% to 0.50%; Si: 0.15% or less; Mn: 0.20% to 1.1%; P: 0.02% or less; S: 0.005% to 0.035%; Cr: more than 0.1% to 0.2%; Mo: 0.05% to 0.5%; Ti: 0.01% to 0.05%; Al: 0.01% to 0.05%; N: 0.01% or less; B: 0.0005% to 0.0050%; Cu: 0.06% to 0.25%; and Ni: 0.05% to 0.2%, and in addition, the composition described above is adjusted so that an LD value represented by the following equation (1) satisfies 120 or less.

$$LD = 0.569 \times \{7.98 \times (C)\}^{1/2} \times (1 + 4.1Mn) \cdot (1 + 2.83P) \cdot (1 - 0.62S) \cdot (1 + 0.64Si) \cdot (1 + 2.33Cr) \cdot (1 + 0.52Ni) \cdot (1 + 3.14Mo) \cdot (1 + 0.27Cu) \cdot (1 + 1.5(0.9 - C)) + 52.6 \quad \dots (1)$$

In the above equation, C, Mn, P, S, Si, Cr, Ni, Mo, and Cu in the equation each indicate the content (mass percent) of the respective elements.